

Interview Summary

Application No.

09/274,601

Applicant(s)

MERMELSTEIN, MICHAEL

Examiner

David N Spector

Art Unit

2873

All participants (applicant, applicant's representative, PTO personnel):

(1) David N Spector (patent examiner).

(3) _____.

(2) Wm. G. Guerin (applicant's representative).

(4) _____.

Date of Interview: 6/20/00.

Type: a) ☒ Telephonic b) ☐ Video Conference
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.

If Yes, brief description:

Claim(s) discussed: 1-22.

Identification of prior art discussed: *that which was submitted under PTO-1449*.

Agreement with respect to the claims f) ☒ was reached. g) ☐ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Examiner contacted applicant's representative to clarify intended meaning of particular features/limitations in the claims (e.g. "synthetic aperture", "overlap region"). Agreement was reached, proposed amendment developed by applicant's representative and reviewed/approved by examiner (attached). Applicant's representative will transmit(FAX)/file "preliminary amendment" with agreed upon changes on 6/21/00.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

i) ☐ It is not necessary for applicant to provide a separate record of the substance of the interview(if box is checked).

Unless the paragraph above has been checked, THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

David Spector
Examiner's signature, if required

UNOFFICIAL COMMUNICATION
FOR DISCUSSION PURPOSES ONLY

PROPOSED CLAIMS

1 1. An interferometric microlithography [synthetic aperture] system for producing a
2 spatially non-periodic pattern [in a region of overlap] comprising:
3 a source of coherent electromagnetic radiation producing a plurality of coherent
4 electromagnetic beams;
5 a plurality of beam controllers, each of said beam controllers positioned to receive
6 a respective one of said plurality of said coherent electromagnetic beams and direct said
7 respective coherent electromagnetic beam into a [said] region of overlap defined by an
8 intersection of all of said plurality coherent electromagnetic beams; and
9 a system controller in electrical communication with each of said plurality of said
10 beam controllers,
11 wherein each beam controller controls at least one of the phase, amplitude and
12 polarization of a respective one of said plurality of coherent electromagnetic beams in
13 response to control signals from said system controller, and
14 wherein [a] said spatially non-periodic pattern is formed within said region of
15 overlap by the interference of said plurality of coherent electromagnetic beams in
16 response to said control signals from said system controller.

1 2. The system of claim 1 further comprising a source controller in electrical
2 communication with said system controller and said source of coherent electromagnetic
3 radiation wherein said source controller controls the amplitude of each of said plurality of
4 coherent electromagnetic beams as a function of time in response to said control signals
5 from said system controller.

APPLICATION: 09/274,601
ATTACHMENT TO
PTO-413 INTERVIEW SUMMARY
6/21/00

UNOFFICIAL COMMUNICATION
FOR DISCUSSION PURPOSES ONLY

1 3. The system of claim 1 wherein said source of coherent electromagnetic radiation
2 comprises:

3 a laser producing a[n] coherent electromagnetic beam; and

4 a beam splitter device positioned to receive said coherent electromagnetic beam

5 and produce said plurality of coherent electromagnetic beams therefrom.

1 4. The system of claim 1 wherein one of said beam controllers comprises an acousto-
2 optic [diffractive] device.

1 5. The system of claim 4 wherein one of said beam controllers comprises an acousto-
2 optic modulator.

1 6. The system of claim 1 further comprising a field stop adjacent to said region of
2 overlap wherein said field stop limits a spatial extent of said spatially non-periodic
3 pattern.

1 7. The system of claim 1 further comprising an apodizing element for at least one of
2 said plurality of coherent electromagnetic beams wherein said apodizing element limits a
3 spatial extent of the at least one coherent electromagnetic beam.

1 8. The system of claim 1 further comprising a receiver to receive said spatially non-
2 periodic pattern.

1 9. The system of claim 8 wherein said receiver comprises a photosensitive [chemical
2 receiver] surface.

09/274,601
(PTO-413)

UNOFFICIAL COMMUNICATION
FOR DISCUSSION PURPOSES ONLY

1 10. The system of claim 8 wherein said receiver receives a plurality of said spatially
2 non-periodic patterns.

1 11. A method for producing a spatially non-periodic pattern [in a region of overlap]
2 comprising the steps of:
3 providing a plurality of coherent electromagnetic beams;
4 directing said plurality of coherent electromagnetic beams into [said] a region of
5 overlap defined by an intersection of all of said plurality coherent electromagnetic beams;
6 and
7 modulating at least one of the phase, amplitude and polarization of at least one of
8 said plurality of coherent electromagnetic beams to thereby form [a] said spatially non-
9 periodic pattern in said region of overlap by the interference of said plurality of coherent
10 electromagnetic beams.

1 12. The method of claim 11 wherein the step of modulating at least one of the phase,
2 amplitude and polarization of said at least one of said plurality of coherent
3 electromagnetic beams comprises the steps of:
4 providing an acousto-optic [diffractive] modulator; and
5 modulating said coherent electromagnetic beam using said acousto-optic
6 [diffractive] modulator.

1 13. The method of claim 11 wherein said step of providing said plurality of
2 electromagnetic beams comprises the steps of:
3 providing a source of a[n] coherent electromagnetic beam; and

Δ9 / 274,601
(PTO - 413)
6/21/00

UNOFFICIAL COMMUNICATION
FOR DISCUSSION PURPOSES ONLY

4 splitting said coherent electromagnetic beam into a plurality of coherent
5 electromagnetic beams.

1 14. The method of claim 11 further comprising the steps of:

2 providing a substrate;

3 providing a layer of photoresist at said substrate; and

4 exposing said photoresist to said spatially non-periodic pattern.

1 15. The method of claim 14 further comprising repeating said steps of modulating and

2 exposing to generate a predetermined pattern in said layer of photoresist.

1 16. The method of claim 11 further comprising the step of calibrating said

2 interference prior to forming said spatially non-periodic pattern.

1 17. The method of claim 11 further comprising the step of calibrating said

2 interference during generation of said spatially non-periodic pattern.

1 18. The method of claim 11 further comprising the step of apodizing said spatially

2 non-periodic pattern.

1 19. An interferometric microlithography [synthetic aperture] system for producing a

2 spatially non-periodic pattern [in a region of overlap] comprising:

3 a source of coherent electromagnetic radiation producing a[n] coherent

4 electromagnetic beam;

5 a beam controller positioned to receive said coherent electromagnetic beam and

6 generate a plurality of coherent output beams; and

7 a system controller in electrical communication with said beam controller,

09 / 274,601
(PTO-412)
6/21/00

UNOFFICIAL COMMUNICATION
FOR DISCUSSION PURPOSES ONLY

8 wherein said beam controller controls at least one of the phase, amplitude and
9 polarization of at least one of said coherent output beams in response to control signals
10 from said system controller, and

11 wherein [a] said spatially non-periodic pattern is formed within said region of
12 overlap by the interference of said plurality of coherent output beams in response to said
13 control signals from said controller.

1 20. The [synthetic aperture] system of claim 19 wherein said beam controller further
2 comprises a source controller in electrical communication with said source of coherent
3 electromagnetic radiation, said source controller controlling the amplitude of said
4 coherent electromagnetic beam produced by said source as a function of time in response
5 to control signals from said system controller.

1 21. The [synthetic aperture] system of claim 19 further comprising at least one beam
2 director positioned to receive a respective one of said plurality of coherent output beams
3 and direct said respective coherent output beam into said region of overlap.

1 22. (New) The system of claim 8 wherein said receiver comprises a photosensitive
2 volume.

1020363_1

09/27/01
(PTO-413)
1/21/02

TESTA, HURWITZ & THIBEAULT, LLP

ATTORNEYS AT LAW

HIGH STREET TOWER

125 HIGH STREET

OFFICE (617) 248-7000

BOSTON, MASSACHUSETTS 02110

FAX (617) 248-7100

TELECOPY COVER SHEET

Equipment Operator Contact Number: 617-248-7462. Please call if you do not receive all the pages.

Date: June 21, 2000**TO: Name: Examiner David Spector****Company: U.S. Patent Office****Address: Washington DC 20231****Telephone: 703 305-1521****Fax: 703 308-7722**

FAX COPY RECEIVED

JUN 21 2000

TECHNOLOGY CENTER 2800

FROM: Sender: William G. Guerin (617) 248-7074**Number of Pages INCLUDING This Cover Sheet:****Client: 5473/112 MIT-106****U.S. Serial No. 09/274,601**

6

Comments:**UNOFFICIAL COMMUNICATION****PLEASE HAND DELIVER TO EXAMINER DAVID SPECTOR****Examiner Spector:**

Per our discussion yesterday afternoon, attached is a proposed set of claims for U.S. Serial No. 09/274,601. Please call me with your comments after you have reviewed them.

1020708

This facsimile is subject to attorney-client privilege and contains confidential information intended only for the person(s) named above. If you have received this facsimile in error, please notify us immediately by telephone and destroy the original transmission without making a copy.

Sent by _____ Date Sent _____ Time Sent _____